

## CLAIMS:

1. An apparatus for filtering particulates from a gas, comprising:
  - a casing defining an inner cavity having an inlet adapted to receive a flow of gas, such that gas enters the inner cavity, and an outlet through which gas exits the inner cavity;
  - a filter associated with the outlet such that gas exiting the inner cavity through the outlet passes through the filter, the filter being adapted to retain particulates beyond a predetermined size from a gas flowing therethrough; and
  - a back-pulse generator positioned downstream of the filter, the back-pulse generator being adapted to cause a reverse flow of gas through the outlet and into the inner cavity of the casing, so as to dislodge a portion of the particulates retained in the filter into the inner cavity.
2. The apparatus of claim 1, further comprising means for accumulating the portion of particulates dislodged from the filter.
3. The apparatus of claim 2, wherein the means are slots in a bottom of the casing.
4. The apparatus according to claim 3, wherein the inlet is generally perpendicular to the bottom of the casing.
5. The apparatus according to claim 1, further comprising a flow generator within the inner cavity of the casing to cause the flow of gas from the inlet to the outlet.

6. The apparatus according to claim 5, wherein the flow generator is downstream of the back-pulse generator.
7. The apparatus according to claim 1, wherein  
5 the casing has a casing portion detachable from a remainder of the casing, the casing portion having the filter and the inlet.
8. The apparatus according to claim 1, further comprising a chemical treatment filter in the inner  
10 cavity downstream of the back-pulse generator.
9. The apparatus according to claim 1, further comprising a nozzle between the filter and the vortex generator, so as to enhance an effect of the reverse flow on the filter.
- 15 10. The apparatus according to claim 1, wherein the filter has a low adherence coating on a filtering side thereof.
11. The apparatus according to any one of claims 1 to 10, wherein the back-pulse generator is a  
20 vortex generator.
12. The apparatus according to claim 11, comprising a plurality of the vortex generator.
13. A method for removing particulates from a filter in a gas filtration system, comprising the  
25 steps of:  
positioning a vortex generator opposite the filter such that the vortex generator faces a filtrate side of the filter;

stopping a filtering flow of gas through the filter; and

actuating the vortex generator so as to cause a reverse flow of gas through the filter to dislodge particulates from the filter.

14. An apparatus for filtering particulates and an undesired gas from a main gas, comprising:

a particulate treatment station having a first inlet adapted to receive a main gas carrying particulates and an undesired gas, a first filter for retaining the particulates in the particulate treatment station, the first filter being in a first casing removable from the particulate treatment station with first filter so as to reduce the exposure to the first filter when replacing the first filter, and a first outlet through which the main gas exits filtered of the particulates;

a chemical treatment station and having a second inlet in fluid communication with the first outlet of the particulate treatment station so as to receive a supply of the main gas from the first outlet of the particulate treatment station, a second filter for reacting with the undesired gas to retain the undesired gas therein, and a second outlet through which the main gas exits filtered of the undesired gas; and

a pressure differential system to cause a flow of the main gas through the particulate treatment station and the chemical treatment station.

15. The apparatus according to claim 14, wherein the first outlet and the second inlet are interconnected by a conduit such that the particulate treatment station and the chemical treatment station are separated from one another.

16. The apparatus according to claim 14, wherein the second filter is in a casing in the chemical treatment station, the casing being removable from the chemical treatment station with  
5 the second filter so as to reduce the exposure to the second filter when replacing the second filter.

17. The apparatus according to claim 14, wherein the pressure differential system has at least one brush motor within the chemical treatment  
10 station.

18. The apparatus according to claim 17, wherein the at least one brush motor is mounted on a hinged plate within the chemical treatment station, such that both sides of the brush motor are readily  
15 accessible.

19. The apparatus according to claim 17, wherein contact elements for the brush motor are secured to a bracket, the bracket being releasably connected to the chemical treatment station.

20. 20. The apparatus according to claim 16, wherein at least one of the first casing and the second casing is on casters.

## AMENDED CLAIMS

[received by the International Bureau on 22 July 2005 (22.07.05);  
original claims 1 to 20 replaced by new claims 1 to 21 (4 pages)]

## CLAIMS:

1. An apparatus for filtering particulates from a gas, comprising:
  - a casing defining an inner cavity having an inlet adapted to receive a flow of gas, such that gas enters the inner cavity, and an outlet through which gas exits the inner cavity;
  - a filter associated with the outlet such that gas exiting the inner cavity through the outlet passes through the filter, the filter being adapted to retain particulates beyond a predetermined size from a gas flowing therethrough; and
  - a back-pulse generator positioned downstream of the filter, the back-pulse generator having a diaphragm actuatable to induce a flow of gas, the diaphragm being oriented such that actuation of the diaphragm causes a reverse flow of gas through the outlet and into the inner cavity of the casing, so as to dislodge a portion of the particulates retained in the filter into the inner cavity.
2. The apparatus of claim 1, further comprising means for accumulating the portion of particulates dislodged from the filter.
3. The apparatus of claim 2, wherein the means are slots in a bottom of the casing.
4. The apparatus according to claim 3, wherein the inlet is generally parallel to the bottom of the casing.
5. The apparatus according to claim 1, further comprising a flow generator within the inner cavity of the casing to cause the flow of gas from the inlet to the outlet.

6. The apparatus according to claim 5, wherein the flow generator is downstream of the back-pulse generator.
7. The apparatus according to claim 1, wherein the casing has a casing portion detachable from a remainder of the casing, the casing portion having the filter and the inlet.
8. The apparatus according to claim 1, further comprising a chemical treatment filter in the inner cavity downstream of the back-pulse generator.
9. The apparatus according to claim 1, further comprising a nozzle between the filter and the vortex generator, so as to enhance an effect of the reverse flow on the filter.
10. The apparatus according to claim 1, wherein the filter has a low adherence coating on a filtering side thereof.
11. The apparatus according to any one of claims 1 to 10, wherein the back-pulse generator is a ring vortex generator.
12. The apparatus according to claim 11, comprising a plurality of the ring vortex generator.
13. A method for removing particulates from a filter in a gas filtration system, comprising the steps of:
  - positioning a ring vortex generator opposite the filter such that the ring vortex generator faces a filtrate side of the filter;

stopping a filtering flow of gas through the filter; and

actuating the ring vortex generator so as to cause a reverse flow of gas through the filter to dislodge particulates from the filter.

14. An apparatus for filtering particulates and an undesired gas from a main gas, comprising:

a particulate treatment station enclosed in a first casing and having a first inlet adapted to receive a main gas carrying particulates and an undesired gas, a first filter for retaining the particulates in the particulate treatment station, the first filter being in a first casing removable from the particulate treatment station with first filter so as to reduce the exposure to the first filter when replacing the first filter, and a first outlet through which the main gas exits filtered of the particulates;

a chemical treatment station enclosed in a second casing physically separated from the first casing and having a second inlet in fluid communication with the first outlet of the particulate treatment station so as to receive a supply of the main gas from the first outlet of the particulate treatment station, a second filter for reacting with the undesired gas to retain the undesired gas therein, and a second outlet through which the main gas exits filtered of the undesired gas; and

a pressure differential system to cause a flow of the main gas through the particulate treatment station and the chemical treatment station.

15. The apparatus according to claim 14, wherein the first outlet and the second inlet are interconnected by a conduit such that the particulate



treatment station and the chemical treatment station are separated from one another.

16. The apparatus according to claim 14, wherein the second filter is in a subcasing associated with the second casing of the chemical treatment station, the subcasing being removable from the chemical treatment station with the second filter so as to reduce the exposure to the second filter when replacing the second filter.

17. The apparatus according to claim 14, wherein the pressure differential system has at least one brush motor within the chemical treatment station.

18. The apparatus according to claim 17, wherein the at least one brush motor is mounted on a hinged plate within the chemical treatment station, such that both sides of the brush motor are readily accessible.

19. The apparatus according to claim 17, wherein contact elements for the brush motor are secured to a bracket, the bracket being releasably connected to the chemical treatment station.

20. The apparatus according to claim 14, wherein at least one of the first casing and the second casing is on casters.

21. The apparatus according to claim 16, wherein the subcasing is on casters.